IN THE CLAIMS

1 (Original). A method comprising:

using a four-membered ring of alternating nitrogen and silicon atoms as a silicon precursor to form a silicon nitride film.

2 (Original). The method of claim 1 further including using a nitrogen precursor to form a silicon nitride film.

3 (Original). The method of claim 1 further including using said silicon precursor at a temperature less than approximately 500°C.

4 (Original). The method of claim 1 including using a four-membered ring comprising the general formula:

$$[R_2SiNR]_2,$$

where each R is selected from the group consisting of a hydrogen, a halogen, an amine, an alkyl, an aryl, a silyl and an organic group having one to approximately twenty carbons.

5 (Original). The method of claim 1 including using a halogenated cyclodisilazane.

6 (Original). The method of claim 1 including using an amine substituted cyclodisilazane.

7 (Original). The method of claim 1 including using cyclodisilazane including an organic group containing one to approximately 20 carbon atoms.

8 (Original). The method of claim 2 including using a nitrogen precursor selected from the group consisting of ammonia, hydrazine and a substituted hydrazine.

9 (Original). The method of claim 2 including combining said nitrogen precursor and said silicon precursor in a premixed cocktail with an optional solvent.

10 (Original). The method of claim 1 including forming a silicon nitride film tuned to have a specific impurity profile.

11 (Original). A method comprising:

using a silicon precursor to form a silicon nitride film, said silicon precursor being a substituted ring comprising the general formula:

(Si)a(N)2a,

where silicon is bound to two nitrogens,

where said nitrogens are bound to said silicon and nitrogen, and

where a is an integer greater than or equal to one.

12 (Original). The method of claim 11 including using 1,2,4,5-tetraaza-3,6-disilacyclohexane as the silicon precursor.

13 (Original). The method of claim 11 including using a silicon precursor comprising the general formula:

Si2N4R8-aXa,

where X is a halogen,

where each R is selected from the group consisting of a hydrogen, a halogen, an amine, an alkyl, an aryl, a silyl and an organic group having one to approximately twenty carbons, and

where a is an integer less than or equal to eight.

14 (Original). The method of claim 11 including using a halogenated derivative of 1,2,4,5-tetraaza-3,6-disilacyclohexane as the silicon precursor.

15 (Original). The method of claim 11 including using a silicon precursor comprising the general formula:

Si2N4R8-a(NR2)a,

where each R is selected from the group consisting of a hydrogen, a halogen, an amine, an alkyl, an aryl, a silyl and an organic group having one to approximately twenty carbons, and

where a is an integer less than or equal to four.

16 (Original). The method of claim 15 including using a silicon precursor selected from the group consisting of 3,6-bis(dimethylamino)-1,4-ditertiarybutyl-2,5-dimethyl-1,2,4,5-tetraaza-3,6-disilacyclohexane and 3,6-bis(tertiarybutylamino)-1,4-ditertiarybutyl-1,2,4,5-tetraaza-3,6-disilacyclohexane.

17 (Original). The method of claim 11 including using a silicon precursor comprising the general formula:

Si2N4R8,

where each R is selected from the group consisting of a hydrogen, a halogen, an amine, an alkyl, an aryl, a silyl and an organic group having one to approximately twenty carbons.

18 (Original). The method of claim 17 including using a silicon precursor selected from the group consisting of 1,2,4,5-tetratertiarybutyl-1,2,4,5-tetraaza-3,6-disilacyclohexane, 3,6-divinyl-1,4-ditertiarybutyl-2,5-dimethyl-1,2,4,5-tetraaza-3,6-disilacyclohexane, 3-phenyl-1,4-ditertiarybutyl-1,2,4,5-tetraaza-3,6-disilacyclohexane, 1,2,4,5-tetramethyl-1,2,4,5-tetraaza-3,6-disilacyclohexane, and 1,2,3,3,4,5,6,6-octamethyl-1,2,4,5-tetraaza-3,6-disilacyclohexane.

19 (Original). The method of claim 11 further including using a nitrogen precursor selected from one of ammonia, a hydrazine or a substituted hydrazine.

20 (Original). The method of claim 19 further including combining said silicon precursor and said nitrogen precursor in a premixed cocktail with an optional solvent.

21 (Original). The method of claim 11 further including forming said silicon nitride film at a temperature less than approximately 500°C.

22 (Original). A method comprising:

combining a silicon source precursor comprising hydrazine including at least two silyl substitutions and a nitrogen precursor; and

forming a silicon nitride film.

23 (Original). The method of claim 22 including combining a silicon source precursor comprising the general formula:

N2(SiR3)aR4-a,

where each R is selected from the group consisting of a hydrogen, a halogen, an amine, an alkyl, an aryl, a silyl and an organic group having one to approximately twenty carbons, and

a is two, three, or four.

24 (Original). The method of claim 22 including combining a silicon source precursor selected from the group consisting of 1,2-disilylhydrazine, 1,1,2-trisilylhydrazine, 1,1,2,2-tetrasilylhydrazine, 1,2-bis(trimethylsilyl)-1,2-ditertiarybutylhydrazine and 1,2-bis(trimethylsilyl)-1,2-diphenylhydrazine.

25 (Original). The method of claim 22 including combining said silicon source precursor and a nitrogen precursor from the group consisting of ammonia, hydrazine and a substituted hydrazine.

26 (Original). The method of claim 25 further including premixing said silicon source precursor and said nitrogen precursor in a cocktail with an optional solvent.

27 (Original). The method of claim 22 including tuning said silicon nitride film to have a desired impurity profile.

28 (Original). The method of claim 22 further including heating a deposition reaction chamber to a temperature that is less than approximately 500°C.

29 (Withdrawn). A system comprising:

a chamber; and

a silicon source coupled to said chamber, said silicon source for use as a silicon precursor selected from the group consisting of a four membered ring of alternating silicon and nitrogen atoms, a silyl substituted hydrazine comprising at least two silyl substitutions, and a compound having a substituted ring comprising the general formula:

(Si)a(N)2a,

where silicon is bound to two nitrogens,

where said nitrogens are bound to said silicon and nitrogen, and

where a is an integer greater than or equal to one.

30 (Withdrawn). The system of claim 29 further including a nitrogen source for a nitrogen precursor coupled to said chamber.

31 (Withdrawn). A silicon precursor comprising a four-membered ring of alternating silicon and nitrogen atoms, said silicon precursor combined with a nitrogen precursor in a chemical vapor.

32 (Withdrawn). The silicon precursor of claim 31 comprising the general formula:

[R2SiNR]2,

where each R is selected from the group consisting of a hydrogen, a halogen, an amine, an alkyl, an aryl, a silyl and an organic group having one to approximately twenty carbons.

33 (Withdrawn). A silicon precursor comprising a compound having a substituted ring comprising the general formula:

(Si)a(N)2a,

where silicon is bound to two nitrogens,

where said nitrogens are bound to said silicon and nitrogen, and

where a is an integer greater than or equal to one,

said silicon precursor and a nitrogen precursor in a chemical vapor.

34 (Withdrawn). The silicon precursor of claim 33 wherein said compound is 1,2,4,5-tetraaza-3,6-disilacyclohexane or a derivative thereof.

35 (Withdrawn). A silicon precursor comprising a hydrazine including at least two silyl substitutions, said silicon precursor combined with a nitrogen precursor in a chemical vapor.

36 (Withdrawn). The silicon precursor of claim 35 wherein said hydrazine includes the general formula:

N2(SiR3)aR4-a,

where each R is selected from the group consisting of a hydrogen, a halogen, an amine, an alkyl, an aryl, a silyl and an organic group having one to approximately twenty carbons, and

a is two, three, or four.